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Safety Study of Milled Beef and Slices Beef Jerky Viewed from Cadmium and Plumbum Heavy Metals Contamination

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ABSTRACT

Heavy metals Plumbum (Pb) and Cadmium (Cd) are chemical contamination that may contaminate during pre-harvest, processing as well as the contribution of environmental factors. The results showed an average content of Pb highest milled beef jerky products from trader C is 2.0177 ppm, while the highest Pb content of beef jerky slices of trader B 2.6680 ppm. The highest average cadmium content of beef jerky products milled from 4 traders coming from trader D is 0.8841 ppm, while the highest Cd content of beef jerky slices of trader B 0.3101 ppm.

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INTRODUCTION

Milled beef jerky is meat with spices rolled into thin sheets, while slices beef jerky is the sheet meat added spices, dried with the help of sunlight and the oven. Milled beef jerky and sliced beef jerky are processed meat products that may be contaminated by heavy metals Plumbum (Pb) and cadmium (Cd). Sources of heavy metal pollution that is from meat as raw material, spices, water and ice. The heavy metal of Pb and Cd pollution can occur during the process of grinding the meat, adding seasoning, molding meat, drying and storage in the open state. The main sources of heavy metal contamination actually that is from the air and water [1]. The sources of pollution mainly derived from motor vehicles and the ink comes from the newspaper. The newspaper used as

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a table cloth by the traders [2]; [3]. Indonesian National Standard (SNI) in 2009 decide rules on the Maximum Residue Limit (MRL) of heavy metal Pb in meat and meat products, including beef jerky is a MRL of 1.0 ppm for residues and heavy metals Cd is equal to 0.3 ppm. This study aims to determine how much heavy metal content of Pb and Cd in milled beef and sliced beef jerky.

MATERIALS AND METHODS

This research is a descriptive study using survey methods of 4 trader from each market. Milled beef jerky obtain from Bandung Andir markets, while slices beef jerky obtained from Bandung Kosambi market. Sampling is purposive for milled beef and sliced beef jerky of 4 trader with repeat 6 times The data were analyzed descriptively. The finding show the average residual heavy metals Pb and Cd greater than the Maximum Residue Limit (MRL) of heavy metals Pb and Cd were recommended by SNI 2009 parameters observed the residual content of heavy metals Cd and Pb .

RESULTS AND DISCUSSION

Content of Heavy Metals Pb Residues in Milled Beef And slices Beef Jerky

Average Pb content of heavy metal residues in milled beef and slices beef jerky shown in Table 1.

Table 1. Content of Heavy Metal Residues Pb

| Type jerky | Average residual content Heavy Metals Pb (ppm) | | | |
|-------------|--|--------|--------|--------|
| | A | B | C | D |
| Milled beef | 1.6429 | 1.5467 | 1.7177 | 1.7728 |
| Sliced beef | 1.5458 | 2.6680 | 0.6456 | 0.4559 |

Average of residual content of heavy metals Pb of 24 samples of milled beef jerky among four traders showed greater than the Maximum Residue Limit (MRL) established by SNI at 1.0 ppm. Average residual content of heavy metals Pb of 24 samples of slices beef jerky of two traders showed greater than the Maximum Residue Limit (MRL) established by SNI at 1.0 ppm, two traders showed still meet conditions by the smaller SNI at 1.0 ppm Average residual content of heavy metal Pb in milled beef jerky is higher than the slices beef jerky Milled beef jerky is mixture of various kinds of materials which suspected as a source of heavy metal Pb contamination. Therefore milled beef jerky has greater contamination opportunities than slices beef jerky. Sources of heavy metal contamination in milled beef jerky and slices beef jerky can be derived from several sources including raw materials, as meat, spices, water and air [4]; [5]; [6].

The presence of heavy metal residues in liver tissue, offal and beef sourced from the feed (grass and concentrate) and water. the spices used for making a beef jerky also being a source of contaminant because the plants can absorb heavy metals from the soil and air. Farmers generally use fertilizers and pesticides to excess. Residual of the heavy metal Pb in crops grown around the highway or mining can be a source of heavy metal contamination and can be detrimental to health [1]; [7]. Another source, can be derived from the base newspaper at the time of the sale of beef jerky. The use of used newspaper paper allows the migration of heavy metals, especially Pb from newspaper ink stick into the beef jerky . In the newspaper ink contained harmful heavy metals such as lead and carbon that is dissolved. Such materials harmful to human health [2].

Content of Heavy Metal Residues Cd In Milled beef And slices Beef Jerky

Average and Pb content of heavy metal residues in milled beef and slices beef jerky shown in Table 2.

Table 2. Content of Heavy Metal Residues Cd

| Type jerky | Average residual content Heavy Metals Cd (ppm) | | | |
|-------------|--|--------|--------|--------|
| | A | B | C | D |
| Milled beef | 0.2156 | 0.3063 | 0.5828 | 0.8841 |
| Slices beef | 0.0079 | 0.3101 | 0.2406 | 0.2737 |

Average residual content of heavy metals Cd of 24 samples of milled beef jerky to three traders showed greater than the Maximum Residue Limit (MRL) established by SNI as a sole trader qualified SNI is less than 0.3 ppm. Average residual content of heavy metals Cd of 24 samples of beef jerky slices from four traders can be said to meet the requirements established by the SNI of ≤ 0.3 ppm. Sources of Cd contamination can be provided from water and seasonings. The use of PVC pipe constitute source of cadmium, because cadmium metal used in the manufacture of PVC [8]; [5]. Spices are used in the manufacture of jerky come from the herb. In general, the distribution of vegetables use phosphate fertilizers containing cadmium in excess and low soil pH thus increasing the availability of cadmium in soils [1]; [9].

CONCLUSION

Residual content of heavy metals Pb and Cd in milled beef jerky greater when compared with the content of heavy metal residues in slices beef jerky. So that the milled beef jerky will be more potentially cause health problems to consumers.

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